

25X1

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27 July 1956

MEMORANDUM FOR: DIRECTOR OF OPERATIONS

SUBJECT : Trip Report to Watertown Strip During USCM

1. Visit to Hycon.

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[redacted] and I visited the Hycon plant to introduce
 [redacted] to the people from Hycon and the photographic equipment. Mr.
 [redacted] conducted us through the plant showing and
 describing the various systems. Later we had an informal conference
 to discuss equipment performance and reliability. The subject of
 their recommendation of the use of "B" camera was discussed and Mr.
 [redacted] explained that he felt the B unit, even though it had about
 a 55% reliability factor at present, would obtain more coverage and
 of better quality than the A-2 system running 100%. It was based on
 this point that he recommended using the "B" camera operationally,
 now. After our discussion concerning the present policy of the use
 of this camera, he agreed that there should be further testing at
 Watertown Strip before sending it overseas. A copy of the total
 number of flights using the "B" camera up to and including the
 18 July 56 is attached ("A"). This record indicates that the major
 causes of malfunction have been the shutter. This shutter, a type
 of "Rapidgno", apparently has an endurance factor of approximately
 1800 cycles before it reaches a point of metal fatigue. The blades
 primarily break down and knife into each other. However, there have
 been other types of malfunction such as shutter springs, drive shafts,
 and bearing failures which have been corrected. The new shutter
 design may be a solution to the shutter problem but could have some
 bugs to work out before it would be considered acceptable. The rate
 of progress to acceptable reliability of the "B" camera has been
 exceptionally good by comparison to a normal program. It is note-
 worthy that the last two flights of the USCM were acceptable. I
 believe that the fallacy of Hycon's recommendation to send the "B"
 camera overseas is thoroughly understood and it is agreed that
 exhaustive testing to correct the malfunctions and raise the
 dependability level of the camera to an acceptable degree should be
 accomplished.

A discussion concerning the camera malfunctions regarding
 the operational use of A-2 configuration was conducted and it was
 determined that these would be thoroughly investigated and immediate

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corrective action taken. They admit that some of these are inexcusable and promise to take the necessary steps through their Technical Representatives overseas to prevent recurrences.

25X1 [redacted] of Hycon had just returned from Eastman and
25X1 reported that [redacted] at Eastman needed .70 mm tracker film to process for training purposes. Eastman has a considerable amount of unprocessed film from the "B" camera configuration exposed during PTF's .

25X1 The senior Hycon Tech Rep for "B" Flight [redacted] will visit Project Headquarters 9 - 10 August.

The USCM

Generally, from my observation of the Unit Simulated Combat Missions conducted by Flight "B", there was demonstrated a high degree of combat readiness. The briefings, debriefings and critiques were conducted in a business like manner consuming a minimum amount of time and effectively accomplishing their objective.

Maintenance and logistic support was performed adequately with few exceptions. These exceptions were:

- a. Abort due to flameout caused by improper throttle management after rough engine operation immediately after take off required Pilot to make landing with gross load.
- b. Oxygen malfunction causing the Pilot to cut his mission short.
- c. Oil pressure gage probably would have delayed take off if mission had not been cancelled.
- d. The Auto-Pilot gave most of the pilots considerable trouble and in some cases it was turned off completely with the pilot flying the entire missions normally. This practically negated the use of the drift sight for most pilots found insufficient time to monitor the drift sight controls properly and keep the auto pilot under control simultaneously. As a result most of the pilots are receiving too little experience in the use of the drift sight and should the "C" camera be phased into the program in the near future, it is doubtful if they would have the desired proficiency in use of this equipment.

The difficulties encountered by the U-2 pilots with regard to the use of the drift sight were a lack of a satisfactorily etched card to assist with fixing targets quickly in the sights. Its use is further complicated by the fact that there are many light and dark

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shadow lens in the drift sight presentation which are aggravated by the intensely bright light at altitude. The argument that this drift sight is not really a drift sight but just a viewer to be used with the C equipment is not really correct. It must be operative as a drift sight in order for the pilot to be able to make the correct drift and track mark settings which in turn are used by the C computer. If the pilot is not able to set these knobs quickly such as is the case in the present equipment, then this equipment is useless with the C equipment. We have run six flight tests to date for the purpose of gathering data for checking the drift sight operation which still shows (1) that the drift knob is hardly ever set correctly in front. In fact, on straight and level runs there will be several settings of the drift knob appearing for both left and right drift. This is corroborated by the observations of the training people and other pilots. Further, several times it appears that two lines are made at 180° to each other where both have left or right drift as much as 5° . On one test made with the drift knob purposely held at 0 the tracking knob was apparently able to be set quite accurately. (2) The tracking function of the drift sight is very jumpy. This erratic tracking appears to be caused by slot in the gearing and seems to follow about a 4-second period. In other words, if the tracking knob was set correctly the drift sight will track the ground for about four seconds and then lose track for about a second and let the terrain pass under in one spot and pick up tracking again for about four seconds more and then repeat. (3) An old problem with the drift sight that has never been corrected is the fairly blunt corners on the etched card which cause lines and yellow and blue shadows to appear on the drift sight presentation. These were noticed in early drift sight operations but were assumed to disappear at altitude because of the infinite focus required by the pilot to see the ground, but the opposite is true. These lines and shadows become more aggravated at altitude because of the non-intensity of light and thus, any one of these lines or shadows will fill up his whole pupil and confuse the ground view much more readily than is apparent in testing the drift sight in a darkened room. As a result of the above, the following steps must be taken to make the drift sight operational: (1) A means of obtaining accurate drift measurements must be incorporated. To do this a piece of plexi-glass with vertical lines inscribed on it will be installed in a drift sight head. This plexi-glass will be moveable by the pilots so he can line up the lines with the terrain moving underneath him. There would be markings so that when he had this lined up he can read his true accurate drift. This is done with the drift sight locked in the vertical detent. This will permit accurate drift reading to be obtained which is then set into the drift knob by the pilot. Thereafter, he has only to work the tracking knob in order to stop the ground presentation since the main drift has been accurately set into the control. This drift can also be rechecked at any time with the drift sight control handles again in the vertical detent. Sets of these plexi-glass drift cards and associated retainers are being made to use at the ranch on the tests in Detachment B aircraft. The prisms which

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are causing the lines and shadows in the presentation must be replaced with prisms with sharp corners, and any other optical fixes to correct the situation must be incorporated. It is obvious that it is possible to practically eliminate this condition because a few of the drift sights are not as aggravating as others. One of the reasons that the tracking needle is jumping is because of the friction in the flexible control tables and their end attachments. The end attachment problem is such that it depends upon the individual mechanic as to how tight he makes the connection between the gearing and the flexible table. The above items must be incorporated immediately by Perkin Elmer through the kit system or by factory overhaul. A flight test program with the drift cards in place will continue to be conducted by Lockheed and the training people which should result in four flights a week. This data will be used to determine the operational suitability of the drift sight for use as a navigational device and for the future use of the C equipment. In conjunction with this flight test program an intensive pilot training and maintenance program with regard to correct drift sight operations must be conducted by the drift sight manufacturer. This means that Perkin Elmer personnel qualified to make area operational decisions must be available to the ranch until all the problems are licked. Whenever such people had appeared at the ranch, they were kept comfortably busy but they were always forced to leave before tying up the loose ends. The above program should result in operational drift sights. If sufficient improvement cannot be made to make the sight operational, then it must be regarded simply as a 45-lb. viewfinder whose future capability with C equipment is questionable. As a further sidelight on this operation, it is noted that the drift sight is being redesigned for the follow-on articles. The basic redesign involved here is the use of the 400 cycle service system in place of the mechanical and flexible table drag now used. It should be noticed that the only problem of the above that this will solve is the one involving the sporadic tracking function. There will still be the same difficulties encountered by the pilots in trying to set in both drift and track with the knobs closely as expected to be at present. No matter how smooth the tracking function is made, the pilots will still have to go through—and process of setting the track line—then the drift line—then the track line—then the drift knob, etc., constantly minimizing his error until it is eliminated. The drift card installation will still be necessary in the servo driven system.

 Lt. Colonel, USAF

Attachment:
Box Score "B" Config.

PEG:adm 80180100

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